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1. **Project:**

Aqaba New Port Project – Grain Terminal Phase II (September 2018)

2. **Location:**

Aqaba – South Jordan.

3. **Client(s):**

Aqaba Development Corporation (ADC).
Represented by:
Dar s.a.l – ARCADI – Dar (Jordan) JV.
ADC had awarded the design and tender document preparation to the joint venture of of Royal Haskoning DHV &ACE. The contract under awarding to the preferred bidder the joint venture of JV Haif & MID Contracting.

4. **Concrete supplier:**

Kingdom Ready Mic Concrete

5. **Tasks:**

The tasks of the above ready mix concrete company is to supply a high quality concrete including pozzolan to satisfy the high specifications requirements set by the project and to fulfil both mechanical and durability requirements with total quantity of 16,500 cu.m concrete. According to the approved Mix design for this project the estimated quantity of **Micrasil®** to be supplied is 575 MT since it is the only pozzolan material approved for this section of the project and mix design stated 35 kg/cu.m.

The project requirements for the both compression strength and durability (represented as RCPT test according to ASTM C 1202) is 37 MPa designed strength and 2,000 coulombs respectively.

The following mix design shows the components designed to fulfill the above requirements.

Components	Quantity	Sources
Cement (CEMII/A-P(42.5 N)	350 Kg.	Portland Pozzolan Cement from Al Qatraneh Cement Co.
Micrasil 10%	35 Kg.	Imerys Minerals Arabia LLC
Water (Free) (W/C = 0.4)	154 Lt.	Main water supply – Aqaba.
20 mm Aggregate	1869 kg in total	Tarawneh Quarry located in wadi Al Tetin - Aqaba
14 mm Aggregate		Tarawneh Quarry located in wadi Al Tetin - Aqaba
Fine Sand (Aqaba Sand)		Tarawneh Quarry located in wadi Al Tetin - Aqaba
Fine Sand (Naqab Sand)		Al Habahbeh Quarry located in Ras Al Nagab.

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٣٨٣٢ - الصبوح – رابغ ٢٥٧٥٤ – ٦١٤٨ - المملكة العربية السعودية
تلفون: ٢٣٤٥ ٨٥٧ ١٣ ٠٠٩٦٦ – فاكس: ٢٥٩٦ ٨٥٧ ١٣ ٠٠٩٦٦
شركة ايميرس مينيرالس العربية (ذ.م.م) – راس المال المدفوع ٧,٥٢٠,٠٠٠ ريال سعودي.
س. ت. ٤٦٠٢٠٠٥٩٦٩

Poly Carboxylic Ether	3.25 Lt.	CTC – Amman Jordan.
Plasticizer (B & D)	1.0 Lt.	CTC – Amman Jordan.

6. Test results:

The following table summarizes the test results obtained from large scale test conducted in the presence of all concerned bodies; i.e. RMC, lab, Consultant and Contractor.

Slump test results	Slump (mm)	Temperature (C)
Initial	240	26.5
After 60 minutes	250	26.9
After 90 minutes	240	27.2

Compressive strength (MPa)	
7 days	45.0
28 days	58.6

Initial surface absorption	
@ 10 min	0.11
@ 30 min	0.05
@ 60 min	0.03
Water penetration (cm)	1.8
Chloride Content (%) by weight of cement	0.04
Sulfate content (%) by weight of cement	3.7
RCP (Coulombs)	1105

7. Value of Micrasil to End user, client and owners of the project:

As with other SCMs when added to concrete the expected improvement of properties can be shortlisted with the following:

- Improved strength and other mechanical properties.
- Reduced permeability hence, increased durability of concrete.
- Reduced segregation and bleeding.

In addition to the above, **Micrasil®** has been capable of providing concrete producer with the following additional properties:

- Better workability.
- Better workability retention and travelling time.
- Considerable reduction in admixture level.
- Reduced Cost.
- Better placeability of concrete and finishing.

- Considerable reduction of repair mortars due to fair face finish.

8. Conclusion:

Micrasil® has performed well in this project and all the parameters required for successful concreting job was achieved successfully using **Micrasil®**.

9. Photos taken from the project and showing the respective work achieved with concrete including Micrasil®

a) Quality Control Check of Concrete.
b) Pouring of Approved Concrete

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